

REMARKS

Pending Claims

Claims 1, 2, 10, and 11 have been amended in order to more clearly describe Applicant's invention. Support for this amendment can be found, for example, in paragraph [0026] and the claims as originally filed. Claims 4 and 13 have been cancelled by this amendment. Dependent claims 5, 6, 14, and 15 have been rewritten in independent form. Claims 52-55 have been amended to recite compositions comprising the disclosed modified pigment products. No new matter has been added. Therefore, claims 1-55 are pending.

Summary of the Invention

The present invention relates to modified pigment products comprising a pigment having attached at least one organic group represented by the formula -X-Sp-Alk, wherein X, which is directly attached to the pigment, represents an arylene, heteroarylene, or alkylene group, Sp represents a spacer group, and Alk represents an alkenyl or alkyl group containing 50-200 carbon atoms. The use of these modified pigment products in non-aqueous dispersion compositions and in several applications, including printing plates, electrophoretic displays, liquid crystal displays, and ink, coating, toner, and polymer compositions is also disclosed.

Election/Restriction

In paragraph 1 of the Office Action, the Examiner states that Applicant's election with traverse of the species of claims 10-18, along with generic claims 1-9, has been acknowledged. However, the Examiner states that the traversal has been found to be unpersuasive since the Examiner has required an election of species and not a restriction. Therefore, in paragraph 2 of

the Office Action, the Examiner has withdrawn claims 19-55 from consideration as being drawn to nonelected species, there being no allowable generic or linking claim.

However, as stated in the previous Office Action dated May 19, 2003, upon the allowance of a generic claim, Applicant is entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim. Therefore, it is Applicant's understanding that claims 19-55 will be considered if amended to depend from or to include the limitations of any of claims 1-9, upon their allowance. For this reason, claims 19-55 have not been withdrawn.

In paragraph 3 of the Office Action, the Examiner has requested, in the interest of compact prosecution, that claims 52-55 be rewritten as proper method claims so that they will be ready for issue if a generic claim is found allowable. Therefore, Applicant has amended claims 52-55 to recite a non-aqueous coating composition, a polymer composition, a non-aqueous ink composition, and a toner composition comprising the modified pigment product of claim 1.

Rejection of Claims under 35 U.S.C. § 102

The Examiner has rejected claims 1 and 9 as being anticipated by Cooke et al. (U.S. Patent No. 6,110,994). Applicant respectfully disagrees.

In paragraph 4 of the Office Action, the Examiner states that Cooke et al. discloses a modified carbon product having attached a group having the formula $-\text{Ar}-\text{CO}_2-\text{R}$ or $-(\text{C}_n\text{H}_{2n})-\text{CO}_2-\text{R}$, wherein R is for example a $\text{C}_{20}-\text{C}_{50}$ alkyl group, stating that R of Cooke et al. corresponds to "Alk" in the present invention. The Examiner concludes that therefore Cooke et al. anticipates the present invention for the modified carbon product where R is a C_{50} alkyl group.

As amended, claim 1 relates to a modified pigment product comprising a pigment having attached at least one organic group represented by the formula $-\text{X}-\text{Sp}-\text{Alk}$, wherein X, which is directly attached to the pigment, represents an arylene, heteroarylene, or alkylene

group, and Sp represents a spacer group. Alk represents a polymer or oligomer of isobutene, butene, or propene containing 60-200 carbon atoms.

In comparison, Cooke et al. discloses a modified carbon product having attached a group having the formula $-\text{Ar}-\text{CO}_2-\text{R}$ or $-(\text{C}_n\text{H}_{2n})-\text{CO}_2-\text{R}$, wherein R is, for example, a $\text{C}_{20}-\text{C}_{50}$ alkyl group. Thus, for the present invention, the range of carbon atoms of Alk is higher and does not overlap with the range of carbon atoms for R of Cooke et al. In addition, there is no teaching or suggestion in Cooke et al. that a range beyond that disclosed may be used, and, in particular, for the specific types of polymers or oligomers of present claim 1. Therefore, Cooke et al. does not disclose a modified pigment product having the attached group of present claim 1.

Applicant therefore believes that claim 1 is not anticipated by Cooke et al. Claim 9, which depends directly from claim 1, discloses a further embodiment of the present invention and, for at least the reasons discussed above, is also not anticipated by Cooke et al. Thus, Applicant believes that claims 1 and 9 are not anticipated by Cooke et al. and respectfully requests that this rejection be withdrawn.

Rejection of Claims under 35 U.S.C. § 103(a)

Cooke et al.

The Examiner has rejected claims 1-4 and 9 as being unpatentable over Cooke et al. (U.S. Patent No. 6,110,994). Applicant respectfully disagrees.

In paragraph 5 of the Office Action, The Examiner states that, in addition to the embodiment discussed in paragraph 4, Cooke et al. discloses a modified carbon product having attached a group having the formula $-\text{Ar}-\text{CO}_2-\text{R}$ or $-(\text{C}_n\text{H}_{2n})-\text{CO}_2-\text{R}$, wherein R is a polymeric group, for example a polyolefin group. The Examiner further states that Cooke et al. does not disclose that the polyolefin group is a polymer of isobutene, butene, or propene, nor that the polymer group contains 50 to 200 carbon atoms. However, the Examiner concludes that it would have been obvious to one skilled in the art to utilize a polymer of isobutene, butene, or

propene that contains 50 to 200 carbon atoms as the polyolefin of Cooke et al. because it is known in the art that polymers of isobutene, butene, and propene are each among the group of polymers referred to generically as polyolefins. The Examiner also concludes that it would have been obvious to one skilled in the art to find the optimum or workable ranges for the number of carbon atoms in the polyolefin group, for the art-recognized purpose of increasing the dispersibility of the modified carbon product.

As amended, claim 1 relates to a modified pigment product comprising a pigment having attached at least one organic group represented by the formula $-X-Sp-Alk$, wherein X, which is directly attached to the pigment, represents an arylene, heteroarylene, or alkylene group, and Sp represents a spacer group. Alk represents a polymer or oligomer of isobutene, butene, or propene containing 60-200 carbon atoms.

In comparison, Cooke et al. discloses a modified carbon product having attached a group having the formula $-Ar-CO_2-R$ or $-(C_nH_{2n})-CO_2-R$, wherein R is a polyolefin. However, Cooke et al. does not teach or suggest that the polyolefin is a polymer or oligomer of isobutene, butene, or propene which further contains carbon atoms in the range of 60 to 200. Thus, while Cooke et al. discloses the general class of polyolefins, there is no teaching or suggestion of a modified pigment product having the specific attached group of claim 1 of the present invention. Thus, Cooke et al. does not provide any guidance to direct one skilled in the art to utilize attached groups having the formula disclosed in claim 1 of the present invention. The present application provides such a teaching, but this can only be attained with the benefit of hindsight. Furthermore, as described in the present specification, these modified pigment products can be used in a variety of applications including non-aqueous dispersion compositions, such as inks, particularly inkjet inks, and coatings, printing plates, thermal transfer recording materials, proofing materials, black matrixes, electrophoretic displays, and toner compositions. This is also not taught or suggested by Cooke et al.

Applicant therefore believes that claim 1 is patentable over Cooke et al. Claims 2, 3, and 9, which depend directly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, is also patentable over Cooke et al.

Claim 4 has been cancelled, making the rejection of this claim moot.

Thus, Applicant believes that claims 1-4 and 9 are patentable over Cooke et al. and respectfully requests that this rejection be withdrawn.

Cooke et al. in view of WO 99/51690

The Examiner has rejected claims 1-4, 9-13, and 18 as being unpatentable over Cooke et al. (U.S. Patent No. 6,110,994) in view of WO 99/51690. Applicant respectfully disagrees.

In paragraph 6 of the Office Action, the Examiner includes the disclosure of Cooke et al. from paragraphs 4 and 5, and adds that Cooke et al. does not disclose a dispersion composition comprising the modified carbon product and a non-aqueous solvent. The Examiner states that WO 99/51690 teaches that modified pigment products having attached thereto a polymer group, for example, a polyolefin group, are preferably capable of being dispersed in a variety of materials, including non-aqueous solvents. The Examiner concludes that it would have been obvious to one skilled in the art to form a dispersion in a non-aqueous solvent, as taught by WO 99/51690, utilizing the modified carbon product of Cooke because it is taught that modified pigment products having polyolefin groups attached have improved dispersibility and dispersion stability in a variety of materials, including non-aqueous solvents.

Regarding claims 1-4 and 9, as amended, claim 1 relates to a modified pigment product comprising a pigment having attached at least one organic group represented by the formula -X-Sp-Alk, wherein X, which is directly attached to the pigment, represents an arylene, heteroarylene, or alkylene group, and Sp represents a spacer group. Alk represents a polymer or oligomer of isobutene, butene, or propene containing 60-200 carbon atoms.

As discussed in more detail above, while Cooke et al. discloses a modified carbon product having attached a group having the formula -Ar-CO₂-R or -(C_nH_{2n})-CO₂-R, wherein R is a polyolefin, Cooke et al. does not teach or suggest that the polyolefin is a polymer or oligomer of isobutene, butene, or propene which further contains carbon atoms in the range of 60 to 200, and this teaching can only be attained with the benefit of hindsight from the present application. Thus, while Cooke et al. discloses the general class of polyolefins, there is no

teaching or suggestion that would guide one skilled in the art to utilize a modified pigment product having the specific attached group of claim 1 of the present invention.

WO 99/51690 relates to modified pigment products having attached polymeric groups, including polyolefin groups. However, as with Cooke et al., there is also no teaching or suggestion in WO 99/51690 that the polymeric group is a polymer or oligomer of isobutene, butene, or propene which further contains carbon atoms in the range of 60 to 200, and therefore, one skilled in the art would not utilize such groups, except with the benefit of the present disclosure. Thus, WO 99/51690 does not cure the deficiencies of Cooke et al.

Applicant therefore believes that claim 1 is patentable over Cooke et al. in view of WO 99/51690. Claims 2, 3, and 9, which depend directly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, is also patentable over this combination of references. Claim 4 has been cancelled, making the rejection of this claim moot.

Regarding claims 10-13 and 18, claim 10 relates to a dispersion composition comprising a non-aqueous solvent and at least one modified pigment product comprising a pigment having attached at least one organic group represented by the formula $-X-Sp-Alk$, wherein X, which is directly attached to the pigment, represents an arylene, heteroarylene, or alkylene group, and Sp represents a spacer group. Alk represents a polymer or oligomer of isobutene, butene, or propene containing 60-200 carbon atoms.

As discussed in more detail above, while Cooke et al. discloses a modified carbon product having attached a group having the formula $-Ar-CO_2-R$ or $-(C_nH_{2n})-CO_2-R$, wherein R is a polyolefin, Cooke et al. does not teach or suggest that the polyolefin is a polymer or oligomer of isobutene, butene, or propene which further contains carbon atoms in the range of 60 to 200, and this teaching can only be attained with the benefit of hindsight from the present application. Furthermore, while WO 99/51690 relates to modified pigment products having attached polymeric groups, including polyolefin groups and further teaches that these modified pigment products are capable of being dispersed in materials including non-aqueous solvents, there is also no teaching or suggestion in WO 99/51690 that the polymeric group is a polymer

or oligomer of isobutene, butene, or propene which further contains carbon atoms in the range of 60 to 200, and therefore, one skilled in the art would not utilize such groups, except with the benefit of the present disclosure. Thus, WO 99/51690 does not cure the deficiencies of Cooke et al.

Applicant therefore believes that claim 10 is patentable over Cooke et al. in view of WO 99/51690. Claims 11, 12, and 18, which depend directly from claim 10, disclose further embodiments of the present invention and, for at least the reasons discussed above, is also patentable over this combination of references. Claim 13 has been cancelled, making the rejection of this claim moot.

Thus, Applicant believes that claims 1-4, 9-13, and 18 are patentable over Cooke et al. in view of WO 99/51690 and respectfully requests that this rejection be withdrawn.

Allowable Subject Matter

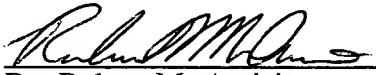
In paragraph 7 of the Office Action, the Examiner has objected to claims 5-8 and 14-17 as being dependent upon a rejected base claim but further states that this would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant is grateful for the allowable subject matter. Claims 5 and 6 have been rewritten in independent form to include the limitations of original claim 1. In addition, claims 14 and 15 have been rewritten in independent form to include the limitations of original claim 10. Since claims 7 and 8 depend from claim 5, and claims 16 and 17 depend from claim 14, no amendments have been made to these claims. Therefore, Applicant believes that claims 5-8 and 14-17 are in condition for allowance and requests that the objection be withdrawn.

Conclusion

In view of the foregoing remarks, Applicant believes that this application is considered to be in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would further expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

By: 
Dr. Robert M. Amici
Reg No. 52,554
Michelle B. Lando, Esq.
Reg. No. 33,941
CABOT CORPORATION
Law Department
157 Concord Road
Billerica, MA 01821-7001
(978)-670-7030

Date: June 14, 2004
Attorney Docket No.: 00054CIP